

Marketing's Influence and New Product Performance in Chinese Firms

ABSTRACT

This article explores the role of marketing in the new product development process from a sociopolitical influence perspective. It makes an explicit distinction between the participation and influence of marketing and empirically investigates their differential effects on new product performance. The results, based on data collected from 114 high-technology firms in China, suggest that marketing's influence is related positively to new product market performance and timeliness of development. They also support the argument that the positive effect of marketing's participation on new product performance is mediated completely by its influence. Furthermore, the study reveals that the effectiveness of marketing's influence on new product performance depends on product newness to the firm, project formalization, perceived power of marketing, and the strength of the influence attempt. Managerial and research implications of the findings are explored.

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It is well documented that marketing's participation in the new product development (NPD) process and its integration with other functional groups, particularly research and development (R&D), are among the most important factors affecting new product success (Ruekert and Walker 1987; Song and Parry 1993; Souder 1988). Although valuable, prior research on marketing's role in NPD has focused on its participation, with little attention paid to its influence (Li and Atuahene-Gima 1996). *Participation* is defined as the amount of information shared between marketing and other participants in the NPD process. It is reflected by the total amount of written or verbal communication that marketing offers to others for consideration in the NPD process (McQuiston and Dickson 1991). In contrast, *influence* pertains to the extent to which information provided by marketing leads to change in the attitudes and behavior of the recipients (e.g., R&D) in the NPD team.

The distinction between these two constructs is not new (Gupta, Raj, and Wilemon 1985, 1986; McQuiston and Dickson 1991; Silk and Kalwani 1982), but it has not been tested systematically in the NPD context. This is unfortunate, because theoretically, participation represents marketing's presence in the communication network of the NPD project. Because received information can be ignored or not used as was intended by the source, marketing's participation in the NPD process only represents a potential for influencing out-

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comes. This suggests that the effect of marketing's participation on new product performance may be mediated by its influence. If this is so, influence may be a more germane factor than participation in understanding marketing's effect on new product performance. Therefore, the first objective of this study is to examine the differential effects of marketing's participation and influence on new product performance and the extent to which the relationship between participation and new product performance is mediated by influence.

Workman (1993) has called for research focusing on marketing's influence in NPD, arguing that its influence depends on the context of the NPD process. In spite of this appeal, no study could be found that has examined the effect of marketing's influence on new product performance in a contingency framework. Therefore, the second objective of the study is to respond to Workman's (1993) call by examining the moderating role of NPD context factors on the relationship between marketing's influence and new product performance.

Prior research on the role of marketing in NPD has a distinct developed-country—particularly North American—bias. Recently, however, researchers increasingly are interested in NPD among firms in contexts other than North America (Atuahene-Gima 1995a; Calantone, Schmidt, and Song 1996; Song and Parry 1993). The increased interest is not only because of the potential competitive threat of these firms in global markets (Atuahene-Gima 1995a), but also because such research offers new comparative insights into the factors affecting new product success among firms in culturally dissimilar countries (Calantone, Schmidt, and Song 1996; Parry and Song 1993; Song and Parry 1993, 1994, 1997). For example, compared with their Western counterparts, Chinese firms have less experience and lower marketing skills in NPD. Yet Calantone, Schmidt, and Song (1996) find that marketing skills/resources and proficiency are more critical than technical skills/resources and proficiency for new product success in China than in the United States. The insight gained from these studies is that the factors affecting new product success in non-Western countries appear consistent with those found by studies in the West, though there may be some differences in potency.

Although this research stream offers important comparative insights, few studies explicitly examine how national cultural values, such as collectivism, power, distance, and uncertainty avoidance (Hofstede 1980), shape the interactions and decision-making behavior of NPD team members (Nakata and Sivakumar 1996; Shane 1994, 1995). With the advent of China's economic liberalization, NPD is viewed as a critical tool for Chinese firms to attain competitive advantage in both domestic and international markets. This is particularly true for firms located in the 120 high-technology experimental

zones. Encouraged by government preferential policies, firms in these zones have been active in NPD. For example, firms in the Beijing Experimental Zone (BEZ), established in 1988, had developed more than 20,500 new products by 1995. Therefore, this study focuses on marketing's participation and influence in NPD among Chinese high-technology firms and examines how cultural values shape the effect of factors likely to enhance or hinder its influence in the NPD process. Because there are several subcultures within China, there are likely to be differences among Chinese managers in NPD, but this study focuses on dominant cultural values (Hofstede 1980).

THEORETICAL BACKGROUND AND HYPOTHESES

Two theoretical perspectives have guided previous investigations of the role of marketing in NPD. The first is the information processing perspective. It suggests that successful NPD is a function of the degree of information transfer and sharing between marketing and R&D (Moenaert and Souder 1990). The logic is that effective participation of both marketing and R&D reduces decision-making uncertainty and enhances NPD outcomes (Gupta, Raj, and Wilemon 1985, 1986; Moenaert and Souder 1990; Parry and Song 1993). The second is the resource dependence perspective, which argues that marketing and R&D are seldom internally self-sufficient with respect to the critical resources required to perform their NPD roles effectively. Therefore, they must interact to ensure an orderly and reliable resource flow to produce effective outcomes (Ruekert and Walker 1987).

Although these works suggest a relationship between functional participation and new product success, empirical results appear contradictory (see Ruekert and Walker 1987; Song and Parry 1993; Workman 1993). Inconsistent findings have led some scholars to argue that information processing and resource dependence theories cannot explain fully the internal dynamics between marketing and R&D and, thus, marketing's effect on NPD outcomes (Li and Atuahene-Gima 1996).

A third but less frequently used approach—sociopolitical theory—suggests that politics are integral in determining the eventual success or failure of an innovation. From this perspective, marketing and R&D struggle for resources and ascendancy in the NPD process through the use of power and influence (Frost and Egri 1991; Maute and Locander 1994). Hence, influence represents a potentially more important factor in explaining marketing's effect on new product outcomes (Li and Atuahene-Gima 1996).

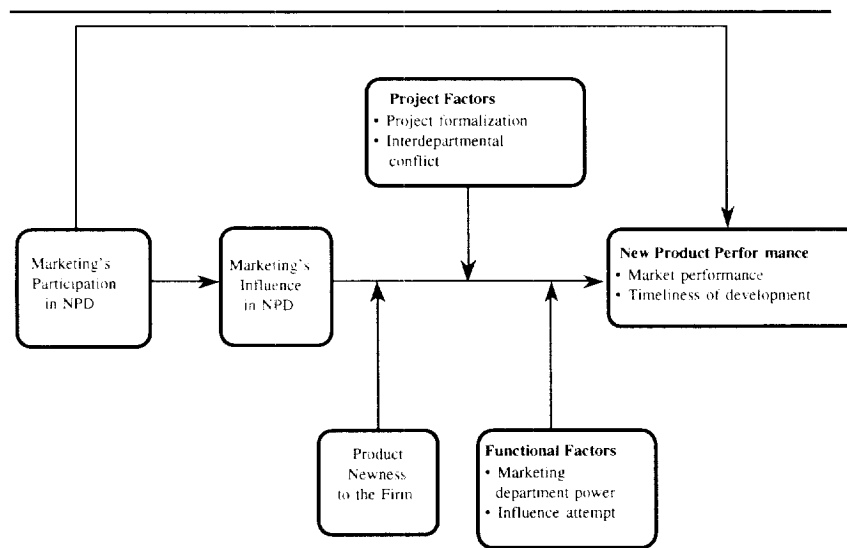
Against this backdrop, Figure 1 presents the conceptual model under examination in this study. It suggests that marketing's participation and influence are drivers of new product performance. Other important factors affect new product performance (for a review, see Montoya-Weiss and Calantone

1994), but the aim of this article is limited to the effect of marketing's participation and influence. The model also suggests that the effect of marketing's influence on new product performance is moderated by project and functional factors, as well as the newness of the product to the firm. Two dimensions of new product performance are examined here: *Market performance* reflects the extent to which the new product has achieved its market share, profit, quality, and other objectives; and *timeliness of development* refers to the extent to which the development process was done in a time-efficient manner (Cooper and Kleinschmidt 1994).

Participation, Influence, and New Product Performance. As indicated previously, participation and influence are two distinct constructs (McQuiston and Dickson 1991; Silk and Kalwani 1982). Participation refers to information shared between marketing and other participants in the NPD process as reflected by the total amount of written or verbal communication (Gupta, Raj, and Wilemon 1985, 1986; McQuiston and Dickson 1991; Parry and Song 1993). In contrast, influence pertains to the extent to which information provided by marketing leads to change in the attitudes and behavior of the recipients (e.g., R&D) in the NPD team. Therefore, influence represents the consequence of marketing's participative behavior (Kohli 1989; McQuiston and Dickson 1991). For marketing to influence NPD outcomes, it must first offer information that has an effect on the NPD team's evaluation and choices. Theoretically, participation is thus an antecedent to influence (McQuiston and Dickson 1991; Silk and Kalwani 1982).

H₁: Marketing's participation is related positively to its influence in the NPD process.

Because the NPD process is political, marketing's contribution to it, and thus to new product performance, depends on



Main Effects

Figure 1. Theoretical Framework of Marketing's Participation and Influence in NPD

the extent of its influence on the project team members. The assumption here is that the level of marketing's influence indicates the extent to which the project team members accept and act on marketing information and recommendations. On the basis of findings that marketing skills and information are critical for new product performance in China (Calantone, Schmidt, and Song 1996; Song and Parry 1994), it is expected that increased influence by marketing leads to higher new product performance. At the initiation stage of NPD, emphasis usually is placed on obtaining strong and viable ideas. Completely new ideas or major changes in the current idea may be costly to accommodate at the implementation stage, because the core concept is established already (Nakata and Sivakumar 1996). Changes at the implementation stage involve higher costs and greater time delays. Therefore, marketing's influence could enhance timeliness of the NPD effort because it ensures that pertinent issues pertaining to customer and market requirements are considered early in the process to prevent subsequent problems and delays.

H₂: Marketing's influence in the NPD process is related positively to new product performance.

Mediating Effects

Because participation only describes the presence of marketing in the NPD communication network, its direct effect on new product performance is uncertain and questionable (Atuahene-Gima 1995b; Li and Atuahene-Gima 1996). Indirect evidence supporting this argument is provided by Wagner's (1994) review of the literature on participatory management and performance in the workplace. He concludes that the effect of participation on performance is so small that it raises concerns about its practical significance. This finding hints at a potential mediator between participation and performance. Here, it is argued that the effect of marketing's participation on new product performance is not direct but indirect, through its effect on influence. This argument is consistent with research that suggests marketing has little effect on NPD decisions when R&D believes that the input is unreliable and is unwilling to accept it (Gupta, Raj, and Wilemon 1985, 1986; Souder 1988; Workman 1993). Therefore, the effect of marketing's participation on new product performance is positive, but it is mediated completely by its influence.

H₃: Marketing's participation is related positively to new product performance, but this relationship will be mediated completely by the effect of marketing's influence in NPD.

Moderating Effects

Kelman (1961) suggests that the effectiveness of influence depends on whether it changes attitudes and/or behavior. He identifies three processes of change: compliance, identification, and internalization. Compliance occurs when an influ-

ence target accepts the requests and demands of the source, not because of a belief in the content of the demands, but because of expected rewards or avoidance of punishment. Therefore, compliance leads to changes in behavior but not to changes in attitudes. Identification occurs when the influence target believes in some of the requests and demands from the source. Internalization takes place when the target accepts the source's demands because they are perceived as congruent with his or her value system. Both identification and internalization lead to change in attitudes and behaviors.

The preceding discussion suggests that marketing's influence is more likely to have a stronger effect on new product performance if it results in changes in attitude and behavior through identification and internalization—when new product team members identify with and accept the demands of marketing as their own. Such internalization leads to efficient uses of marketing's information. When new product team members only comply with demands, they might change behavior but not their attitudes. In such a case, the effect of marketing's influence on new product performance is less likely to be strong. Prior research (e.g., Gupta, Raj, and Wilemon 1985, 1986; Kohli 1989; Ruckert and Walker 1987; Workman 1993) suggests that several factors might affect the three change processes. Five of these factors are examined as potential moderators in this article (see Figure 1).

Project formalization refers to the use of rules and standard operating procedures to perform a job in the NPD team. Previous studies have found that the degree of formalization has a positive impact on information use (Gupta, Raj, and Wilemon 1985, 1986; Song and Parry 1993). For example, Ruckert and Walker (1987) show that formal, structured ties between marketing and other functional groups minimize misunderstanding. Formalized communication tends to reduce conflict between marketing and R&D, which in turn increases information transfer and the favorableness of information reception (Moenaert and Souder 1990).

The collectivist nature of Chinese society (Hofstede 1980) suggests that project formalization is likely to enhance cooperation and reduce conflicts and, thus, enhance the efficacy of marketing's influence. The logic is that, in China, new product decisions are based on consensus (Calantone, Schmidt, and Song 1996). Consequently, a new product task will be incomplete if people with organizationally assigned roles are not included. In addition, high uncertainty avoidance leads to greater concern for formal procedures and communication (Hofstede 1980). In such a culture, standard rules and procedures in NPD are used to reduce uncertainty and ambiguity (Shane 1995), and NPD team members are likely to feel uncomfortable engaging in behaviors that are at variance with

the formal rules and regulations (Shane 1994). Because of the uncertainty avoidance nature of Chinese society, new product team members are more likely to accept and follow formal rules and policies to maintain group harmony and consensus decision making. Formalization of new product activity is likely, therefore, to accord greater legitimacy and credibility to marketing. Hence, it is likely to enhance the efficacy of marketing's influence on new product performance because team members are likely to identify with its demands.

H₄: The effect of marketing's influence on new product performance is stronger when project formalization is high rather than low.

Interdepartmental conflict refers to a state of mutual disagreement, lack of cooperation, and lack of trust between marketing and other departments in the NPD process. When there is a high degree of such conflict, political maneuvering will increase in the project team. Team members pursue mutually conflicting strategies and struggle for self-interest. In this situation, the political activities among departments might decrease the effectiveness of marketing's influence on NPD decisions. Furthermore, managers in collectivist societies such as China prefer to champion new product ideas through personal interaction and relationships (Shane 1994). Because of the great belief in social conformity, interdepartmental conflicts can be extremely pernicious in China. When there is high interdepartmental conflict, this preferred personal approach to information sharing will be stifled. Because NPD is a consensus process in China, the lack of personal interactions as a result of interdepartmental conflicts will lead to not only many incomplete tasks but also inefficiency in the tasks that are completed. The logic is that the team might comply with marketing's demands rather than internalize them. Such compliance is argued to reduce the efficacy of marketing's influence on new product performance (Kelman 1961).

H₅: The effect of marketing's influence on new product performance is weaker when interdepartmental conflict is high rather than low.

Product newness to the firm reflects the amount of relevant experience on which a firm's personnel can draw in developing and marketing a new product (Olson, Walker, and Ruekert 1995). In this article, product newness represents the degree to which the new product is unrelated to the current experience and operations of the firm. New product teams encounter greater difficulty, take more time, and are aware of fewer alternatives when developing a product new to the firm than one related to their previous experience (Olson, Walker, and Ruekert 1995). Therefore, the development task for unrelated, more innovative products will be more uncer-

tain and risky than for incremental products that are more closely related to the firm's current operations. Marketing's role in the NPD process is to reduce uncertainty and risk by providing access to pertinent market and customer information (Moenaert and Souder 1990). Consequently, when the new product is unrelated to the firm's current operations, market information is likely to be perceived as more important for NPD success and more valued by the project team than when the new product is related to current operations.

High uncertainty avoidance leads to a greater emphasis on planning and controls, which should ensure that all aspects of the NPD process are integrated to reduce errors (Nakata and Sivakumar 1996). Shane (1994) finds that uncertainty avoidance leads new product champions to adopt more formal planning, rules, and norms to promote innovation. Because a product new to the firm is highly risky and has a high potential for failure, uncertainty avoidance should ensure the inclusion of information from all pertinent functions in the NPD process. This is likely in China, because managers tend to avoid risks and strive for certainty due to the high uncertainty avoidance of their culture (Tan and Litschert 1994). Furthermore, uncertainty avoidance creates a bias toward greater acceptance of experts (Hofstede 1980). We argue, therefore, that new product teams are more likely to value the expertise of marketing and rely on its input when developing products with high uncertainty and risks. Consequently, NPD team members are likely to identify with and internalize marketing's information when the product is new to the firm.

H₆: The effect of marketing's influence on new product performance is stronger when the product newness to the firm is high rather than low.

Departmental power describes the relative importance accorded to the marketing department by top management. Kohli (1989) argues that departmental power is an important power type in organizational decision making because various departments within an organization have different ability to obtain resources. When there is power imbalance, the weaker party will take measures to limit its dependence on the more powerful party. Such measures include failure to use information provided by the more powerful party. Furthermore, the weaker party may change its behavior to comply with suggestions, but because of the psychological pressure, he or she is unlikely to identify with and internalize them, leading to inefficiency in usage (Kelman 1961). This argument suggests that, when marketing is perceived to be more powerful in the NPD team, other departments will attempt to counter and/or resist its power by simply complying with its suggestions. Such resistance will reduce the efficacy of the impact of marketing's influence on new product performance.

Further support for this reasoning is based on the power distance nature of the study context. In Chinese society, decision making is deferred to people with high status and power in the organization (Hofstede 1980). Because information is not exchanged freely in power distance societies, new product team members are limited by their status in gaining access to information (Shane 1994). It is likely that information from powerful parties may be used without any scrutiny. Therefore, when marketing is perceived to have relatively greater power, other team members are likely to comply with its demands without scrutiny, rendering its influence less effective. Furthermore, the use of power is antithetical to the consensual process of NPD in a collectivist culture. It is expected that the perceived power of marketing hinders the efficacy of its influence on new product performance.

H₇: The effect of marketing's influence on new product performance is lower when its departmental power is perceived as high rather than low.

Influence attempt is defined as the amount of effort that marketing exerts to achieve influence in the NPD process. Previous studies have found that a stronger influence attempt tends to lead to greater influence (e.g., Kohli 1989). The theory linking influence attempts and influence rests on the assumption of personal or departmental stake in the outcomes of the new product process. Marketing has a stake because the process may lead to either positive outcomes (such as higher prestige and status in the firm) or negative consequences (such as reduced career prospects and rewards) (McQuiston and Dickson 1991). Stronger influence attempts allow marketing to have more time to explain and provide rationales for its demands. Because decision making is deferred to experts in power distance societies (Hofstede 1980), greater marketing efforts to achieve influence enhance its perceived credibility and expertise to provide NPD information. With stronger influence attempts, marketing's demands are more likely to be internalized by the NPD team members. Therefore, marketing's influence will have greater effect on new product performance when accompanied by strong influence attempts instead of weak ones.

H₈: The effect of marketing's influence on new product performance is stronger when its influence attempt is strong rather than weak.

METHODOLOGY

Sample and Data Collection

A random sample of 200 firms was selected from a sample frame provided by the Association of High and New Technology Enterprises in BEZ. All the firms held the New-Tech Enterprise Certificate and Instrument of Ratification approved and issued by the BEZ office. International researchers have noted the challenge, time, and expense of collecting data in

China (e.g., Calantone, Schmidt, and Song 1996). To overcome these difficulties, the director of BEZ persuaded 114 firms with 200 projects to agree to participate in the study. The research is based on perceptual data collected from R&D respondents. They, rather than marketing personnel, were selected as informants for three reasons: First, prior research suggests that asking informants to assess their own influence leads to upward bias (McQuiston and Dickson 1991; Silk and Kalwani 1982). Second, R&D personnel are closest to the NPD process, compared with other personnel. Thus, they are expected to be knowledgeable about not only the role of marketing, but also the outcomes of the NPD process (see Workman 1993). Third, because marketing and R&D are the two primary functions that participate in the NPD process on a day-to-day basis (Gupta, Raj, and Wilemon 1986; Parry and Song 1993; Souder 1988), it is argued that R&D personnel are the major targets of marketing's influence. If so, R&D personnel might be more familiar with marketing personnel's behavior than other members in the project team. Furthermore, the R&D respondents in this sample had participated in an average of 4.93 projects, which gave them substantial experience (see the Appendix).

To improve the validity of the data collected, three actions were taken. First, the R&D informant was asked to identify the firm's most recently developed new product that had been in the market a sufficient time to measure its performance. Second, following Kohli's (1989) work, the R&D informant was asked to answer the questionnaire with reference to a specific marketing person about whose behavior in the NPD process he or she was most knowledgeable. Third, an interview approach was used to collect the data. The interviewer ensured that the R&D respondent was directly involved in the project selected and understood the purpose of the research and that the interview focused on the appropriate project. Eight experienced MBA students from a reputable university in China conducted the interviews. Information about 128 of the 200 NPD projects was received from firms in information technology, chemicals, electrical/electronic, and new pharmaceuticals and bioengineering industries. This represents a response rate of 64%. Using the respondent's business card, one of the authors telephoned each respondent to confirm that the interview actually took place and that he or she completed the questionnaire.

Previously developed measures were adapted for the study (Cooper and Kleinschmidt 1994; Kohli 1989). To avoid cultural bias and ensure validity, special attention was paid to establishing equivalence of the measures. The original English questionnaire first was reviewed and revised by experts in marketing, then translated into Chinese, and finally back-translated into English. Different translations were compared to detect any significant misunderstandings due to translation. The instrument was pretested with 12 R&D managers. Three main issues were

Measurement

covered during these interviews. First, each manager provided opinions on marketing–R&D relationships in NPD and the specific role of each function. Second, the factors that tended to enhance or hinder the successful completion of new product projects in their firms were explored. Third, each manager provided opinions of the measurement scales, their relevance to the Chinese context, and their completeness. Each manager then was asked to complete the questionnaire and verbalize any thoughts that came to mind, including ambiguities, inapplicable questions, and suggestions for improvement. Table 1 contains the measures for each construct.

Two control variables were included. The first, self-perceived influence, refers to the influence the R&D informant believes he or she exerted in the NPD process. It was included to account for the possibility that the R&D informants may attribute less influence to marketing if they perceive their own influence to be high (Kohli 1989). The second, project team size, refers to the number of persons in a new product project team. Previous studies suggest that team size has a significant effect on the influence of participants in a decision-making process (Kohli 1989).

Scale Validity and Reliability

Confirmatory factor analyses (CFA) were performed to examine the validity of the measures. Because of sample size restrictions, three separate CFAs were performed. Following Kohli and Jaworski's (1994) research, the seemingly most related constructs were analyzed together. This approach was taken because if items measuring conceptually similar constructs are found to have convergent and discriminant validity, such a procedure may provide a more conservative test of validity than one involving items measuring dissimilar constructs (Kohli and Jaworski 1994). The results appear in Table 1. The fit indices appear to indicate reasonable fit of the models. Furthermore, all items loaded on their respective constructs, and each loading is large and significant above the .01 level, indicating convergent validity. Discriminant validity is indicated because the confidence interval around the correlation estimate between any two constructs was less than 1.0 (Anderson and Gerbing 1988, p. 416).

A model in which this correlation was constrained was compared with an unconstrained model. To satisfy the discriminant validity criteria, the fit of the model with the unconstrained correlation should be significantly better than that of the constrained model. The results of the pairwise tests among the constructs indicated support for discriminant validity. (Results of this analysis are available on request.) Internal consistency was assessed by computing Cronbach's alpha only for multi-item scales. As shown in Table 2, these are greater than .60, with one exception, and thus meet the standards recommended by Nunnally (1978).

Item Description Summary	Standardized Loading	t-value
Constructs in Model 1		
Market Performance^a		
1. Overall company satisfaction with quality of the product	.50	5.51
2. Quality level of the product relative to competition	.51	5.62
3. Quality level relative to other products of the firm	.58	6.58
4. Degree to which sales objectives have been achieved	.70	8.40
5. Degree of customer acceptance of the product	.72	8.68
6. Market share relative to stated objective	.69	8.16
7. Profit margin relative to stated objective	.74	8.94
Timeliness of Development^b		
1. The project adhered to a specific time schedule.	.58	6.08
2. The project was done in a time-efficient manner.	1.05	9.67
3. Relative to other products developed in the firm, it took a shorter time to launch the product.	.52	5.51
Constructs in Model 2		
Influence^a		
1. How much weight did the project team give to his or her input?	.68	8.51
2. How much impact did he or she have on the thinking of the project team members?	.76	9.92
3. How much effect did his or her involvement in the new product team have on how the various options were rated?	.78	10.27
4. To what extent did he or she influence others into adopting certain positions about the various options?	.82	10.98
5. How much change did he or she induce in the preferences of other members?	.85	11.66
6. To what extent did others go along with his or her ideas?	.81	10.75
7. To what extent did the final decision reflect his or her views?	.80	10.72
Influence Attempt^b		
Relative to others,		
1. He or she spent more time to impress his or her views on the team members.	.59	6.87
2. He or she tried harder to shape the thinking of others.	.76	9.52
3. He or she spent more energy to make sure his or her opinions were taken into account.	.90	12.16
4. He or she exerted more effort to make sure the final product reflected his or her views.	.78	9.96
Participation^b		
1. He or she offered a large amount of relevant information for consideration during the discussion of alternatives.	.80	9.25
2. He or she offered a large amount of relevant information as reference for decision making.	.89	10.41
3. The amount of information and data provided by him or her was negligible (r).*	.45	4.90
Constructs in Model 3		
Project Formalization^b		
1. Standard operation procedures have been established for new product projects.	.86	7.27
2. The terms of departmental relationships within the project have been explicitly verbalized or discussed.	.56	5.44
3. Formal communication channels are followed.	.45	4.45
Marketing's Departmental Power^b		
1. Marketing's suggestions are easily adopted by top management.	.40	3.53
2. The marketing department dominates the affairs of the firm.	.51	4.09
3. Marketing's function is considered more critical than others.	.78	4.86
Interdepartmental Conflict^b		
1. R&D and marketing in the team get along well with each other (r).*	.83	8.82
2. When R&D and marketing personnel get together, tensions frequently run high.	.61	6.53
3. For each decision of the project, R&D and marketing make it a point to keep each other well informed (r).*	.67	7.20

*Constructs were measured with a five-point scale: 1 = very low, 5 = very high.

^aConstructs were measured with a five-point scale: 1 = strongly disagree, 5 = strongly agree.

*r denotes reverse coded.

Note: Model fit indices are as follows: Model 1 $\chi^2 = 79.02$ ($p = .00$), $\chi^2/df = 2.32$, goodness-of-fit index (GFI) = .89, root mean square approximation of error (RMSEA) = .10, nonnormed fit index (NNFI) = .85, comparative fit index (CFI) = .89; Model 2 $\chi^2 = 173.67$ ($p = .00$), $\chi^2/df = 2.33$, GFI = .84, RMSEA = .10, NNFI = .88, CFI = .90; and Model 3 $\chi^2 = 33.37$ ($p = .10$), $\chi^2/df = 1.39$, GFI = .95, RMSEA = .06, NNFI = .93, CFI = .95.

Table 1.
Construct Measurement
Summary: Confirmatory
Factor Analyses

Table 2.
Descriptive Statistics and
Reliabilities of the Study
Constructs

Construct	Mean (Standard Deviation)	Mean												
		1	2	3	4	5	6	7	8	9	10			
1. Market performance	3.69 (.61)	.84*												
2. Timeliness of development	3.66 (.82)	.22	.75											
3. Influence	3.52 (.79)	.26	.41 ^a	.92										
4. Participation	3.57 (.87)	.13	.22	.46 ^a	.78									
5. Project formalization	3.34 (.84)	.21	.31 ^b	.24	.08	.64								
6. Interdepartmental conflict	2.15 (.76)	-.31 ^b	-.28 ^b	-.39 ^a	-.46 ^a	-.21	.74							
7. Product newness to the firm	3.58 (1.30)	.29 ^b	.20	.21	.30 ^a	.25	-.23	—						
8. Departmental power	3.60 (.75)	-.04	-.01	.10	.18	-.07	-.08	.10	.56					
9. Influence attempt	3.56 (.81)	.23	.36 ^a	.58 ^a	.51 ^a	.18	-.28 ^b	.28 ^b	.10	.85				
10. Self-perceived influence	3.60 (.71)	.21	.15	.27 ^b	.14	.22	-.43 ^a	.06	.21	.15	.71			

^a $p < .001$.

^b $p < .01$.

*Coefficient alphas are shown in the diagonal.

ANALYSIS AND RESULTS

The first three hypotheses were tested using ordinary least square (OLS) regression analysis. The moderating effects were tested using moderated regression analysis. Prior to the creation of the interaction terms, the independent and moderator variables were mean centered to reduce multicollinearity (Cronbach 1987). To examine further the potential threat of multicollinearity, the variance inflation factor (VIF) for each of the regression coefficients was calculated to assess the degree to which relations among the independent variables inflate the standard errors. The VIFs ranged from 1.014 to 1.851, suggesting that multicollinearity is unlikely to threaten the parameter estimates (Neter, Wasserman, and Kutner 1989). The type of moderator was determined. If the interaction term is significant but the moderator's main effect is not significant, the moderator in question is classified as a pure moderator. If both the interaction term and the moderator's main effect are significant, the moderator is classified as a quasi moderator. Finally, if the interaction term is not significant but the moderator's main effect is significant, the hypothesized moderator is classified as a predictor. Table 3 presents results pertaining to H_1 – H_3 .

In support of H_1 , marketing's participation is related positively to marketing's influence ($\beta = .34$, $p < .01$). Similarly, marketing's influence has a significant positive relationship with a new product's market performance ($\beta = .29$, $p < .05$) and timeliness of development ($\beta = .34$, $p < .01$), in support of H_2 . H_3 was supported. In the absence of influence, market-

	Dependent Variables				
	Influence β	Market Performance β		Timeliness of Development β	
Independent Variables					
Participation	.34 ^a	.13 ^b	-.02	.13 ^b	-.01
Influence	—	—	.29 ^c	—	.34 ^a
Control Variables					
Self-perceived influence	.25 ^b	.33 ^a	.26 ^b	.05	-.04
Team size	-.21 ^b	.09	.05	.02	.07
R ²	.28	.15	.21	.02	.11
Adjusted R ²	.26	.13	.17	-.01	.08
F-value	14.26 ^a	5.77 ^a	5.99 ^a	.77	3.21 ^b
Degrees of freedom	3/112	3/97	4/92	3/107	4/102

^a $p < .01$.

^b $p < .10$.

^c $p < .05$.

Note: Significance levels shown are one-tailed for hypotheses testing variables and two-tailed for controls.

ing's participation is related positively to market performance ($\beta = .13$, $p < .10$) and timeliness of development ($\beta = .13$, $p < .10$). As Table 3 shows, in the presence of influence, participation has no relationship with either NPD outcome. These findings support the argument that participation is an antecedent to influence and that the effect of marketing's participation on new product performance is indirect through influence. In other words, the positive effect of marketing's participation on new product performance is mediated completely by influence.

Results for H_4 – H_8 are presented in Table 4. The data do not support H_4 . The effect of influence and project formalization interaction is not significant with respect to a new product's market performance. The effect is significant with respect to timeliness of development, but it is in a reverse direction of the hypothesis ($\beta = -.21$, $p < .05$). This finding suggests that marketing's influence on timeliness of development is hindered when the NPD project is highly formalized. The main effect of project formalization on timeliness of development is positive and significant ($\beta = .22$, $p < .05$), which suggests that project formalization is a quasi moderator. Formally setting standard operating procedures and the nature of relationships among departments for the NPD project appears to reduce delays in the development process.

H_5 was not supported. Interdepartmental conflict operates as a predictor because its main effect is significant and related negatively to market performance ($\beta = -.16$, $p < .10$) and timeliness of development ($\beta = -.17$, $p < .10$). Similarly, the data failed to support H_6 . Contrary to the hypothesis, the effect of the interaction between influence and product newness to the firm on market performance is significant but negative ($\beta = -.13$, $p < .10$). Although not overwhelming, the

Table 3.
Regression Analyses Predicting
Participation, Influence, and
Performance

Table 4.
Moderated Regression
Analyses Results
(Standardized Parameter
Coefficients)

Independent Variables	Dependent Variables	
	Market Performance	Timeliness of Development
	β	β
<i>Control Variables</i>		
Self-perceived influence	.20 ^a	-.08
Team size	.07	.05
<i>Main Effects</i>		
Influence	.20 ^a	.18 ^b
Project formalization	.07	.22 ^a
Interdepartmental conflict	-.16 ^b	-.17 ^b
Product newness to the firm	.16 ^b	.12
Departmental power	-.12 ^b	-.04
Influence attempt	.01	.18 ^b
R ²	.27	.24
<i>Interaction Effects</i>		
Influence x project formalization	-.05	-.21 ^a
Influence x interdepartmental conflict	-.07	-.12
Influence x product newness to the firm	-.13 ^b	.11
Influence x departmental power	-.22 ^a	-.14
Influence x influence attempt	.23 ^a	.09
Incremental R ²	.08 ^b	.05
F change	1.95	1.25
Significance of F change	.09	.29
<i>Full Model</i>		
R ²	.35	.29
Adjusted R ²	.25	.19
F value	3.45 ^c	2.87 ^c
Degrees of freedom	13/82	13/90

^a $p < .05$.

^b $p < .10$.

^c $p < .01$.

Note: Significance levels shown are one-tailed for hypothesis testing.

result seems to suggest that greater marketing influence harms market performance when the new product is unrelated to the firm's operations or experiences. Product newness to the firm operates as a quasi moderator because its main effect is positive and significant on new product market performance ($\beta = .16$, $p < .10$). With respect to timeliness of development, both the interaction and main effects of product newness are positive but not significant.

H₇ was supported with respect to market performance. The interaction between marketing's influence and departmental power has a significantly negative effect on market performance ($\beta = -.22$, $p < .05$). The main effect of departmental power is negative and significant with respect to market performance ($\beta = -.12$, $p < .10$). Departmental power therefore operates as a quasi moderator. H₈ was supported partially. The interaction between influence and influence attempt has a significant and positive relationship with a new product's market performance ($\beta = .23$, $p < .05$). The implication is that, when marketing personnel devote greater efforts to make

their case, they achieve more effective influence, because such attempts lead to greater conviction among team members about their requests. Influence attempt operates as a pure moderator, because its main effect on market performance is not significant. With respect to timeliness of development, the interaction effect of influence and influence attempt is not significant, but the main effect of influence attempt is positive and significant ($\beta = .18, p < .10$). It seems that marketing's influence attempt in and of itself facilitates timeliness of development. Table 5 presents the hypotheses and empirical conclusions.

Hypotheses	Expected Sign	Empirical Conclusion
H ₁ : Marketing's participation is related positively to its influence in the NPD process.	+	Supported
H ₂ : Marketing's influence in the NPD process is related positively to new product performance.		
•Market performance	+	Supported
•Timeliness of development	+	Supported
H ₃ : Marketing's participation is related positively to new product performance, but this relationship will be mediated completely by the effect of marketing's influence in NPD.		
•Market performance		Supported
•Timeliness of development		Supported
H ₄ : The effect of marketing's influence on new product performance is stronger when project formalization is high rather than low.		
•Market performance	+	Not Supported
•Timeliness of development	+	Refuted
H ₅ : The effect of marketing's influence on new product performance is weaker when interdepartmental conflict is high rather than low.		
•Market performance	-	Not Supported
•Timeliness of development	-	Not Supported
H ₆ : The effect of marketing's influence on new product performance is stronger when the product newness to the firm is high rather than low.		
•Market performance	+	Refuted
•Timeliness of development	+	Not Supported
H ₇ : The effect of marketing's influence on new product performance is lower when its departmental power is perceived as high rather than low.		
•Market performance	-	Supported
•Timeliness of development	-	Not Supported
H ₈ : The effect of marketing's influence on new product performance is stronger when its influence attempt is stronger rather than weaker.		
•Market performance	+	Supported
•Timeliness of development	+	Not Supported

Table 5.
Summary Results of
Research Hypotheses

DISCUSSION

This study investigated marketing's role in the NPD process from a sociopolitical influence perspective and empirically examined the situations in which marketing's influence enhances new product performance in high-technology firms in China. The results support the arguments regarding the importance of differentiating between marketing's participation and its influence in the NPD process. Furthermore, the study provides evidence about the conditions in which marketing influences new product performance in general (Workman 1993) and in China in particular. The results suggest that marketing's influence has a significant effect on market performance and timeliness of development. They also support the prediction that though marketing's participation in the NPD process is significantly related to new product market performance and timeliness, this is completely mediated by its influence. Thus, it seems that to understand the contribution of marketing to the outcomes of the NPD process, it is critical to differentiate between its participation and influence.

The contribution here is that information processing and resource dependence theories provide limited insight into marketing's effect on new product performance. These theories posit that more participation and information sharing between marketing and R&D imply higher levels of integration, which in turn lead to higher new product performance (Gupta, Raj, and Wilemon 1986; Parry and Song 1993). The implicit assumption is that information sharing and resource flow might lead to the use of such information by NPD team members. The findings of this study do not support this assumption. Rather, they suggest that a sociopolitical perspective that emphasizes marketing's influence may be more pertinent in understanding marketing's role in NPD (Frost and Egri 1991; Li and Atuahene-Gima 1996; Maute and Locander 1994). This is indicated by the strong effect of marketing's influence on new product performance and its complete mediation of the effect of participation on both NPD outcomes. It is acknowledged, however, that participation, as conceptualized here, taps the quantity of marketing information shared with the NPD team. Other dimensions, such as quality, novelty, and timeliness of information, might operate differently. Further research should pursue this line of inquiry.

The findings suggest that the effectiveness of marketing's influence on new product performance depends on the NPD context. When the NPD activity is highly formalized, marketing's influence is more likely to have a negative effect on new product performance—particularly on timeliness of development. A possible reason is that the collectivist nature of Chinese culture and consensus decision making in NPD in China (Calantone, Schmidt, and Song 1996) result in formalization that leads to such bureaucratic arrangements that participants lose sight of the larger project and its objectives. Instead, they

might concentrate on their assigned duties, thereby hampering coordination and collaboration. High uncertainty avoidance leads to greater concern for formal procedures and communication, which results in slow and inflexible decision making (Nakata and Sivakumar 1996; Shane 1994, 1995). Therefore, it is possible that new product team members in the Chinese firms examined here spend too much time and energy dealing with the coordination and communication problems engendered by project formalization. Marketing information provided in such a context loses its relevance and value for the entire project, thus reducing the efficacy of marketing's influence. Interdepartmental conflict does not moderate the effect of marketing's influence on new product performance. Instead, the results show that interdepartmental conflict has a direct negative effect on a new product's market performance and timeliness of development. Conflicts between marketing and other team members reduce effective internalization and efficient use of marketing input by the new product team (Gupta, Raj, and Wilemon 1986), thus hampering performance and slowing development efforts.

The findings suggest that, in developing products new and unrelated to the firm's operations, a high level of marketing influence is likely to hinder market performance. This finding is contrary to arguments that developing innovative products requires the influence of marketing because of the high risk and uncertainties involved in such projects (Song and Parry 1993). Several reasons might account for this result. Marketing usually is perceived to lack the technical skills to provide information required to develop such products (Workman 1993). Therefore, marketing's recommendations and suggestions might be viewed by the new product team as uninformed. Another plausible explanation is that traditional marketing research techniques are relatively less useful for innovative products (i.e., new to the firm and to the market) than for products better known to providers and customers. In addition, market information for products new to the firm is likely to be of higher novelty than that for products not new to the firm. Moenaert and Souder (1996) find that novelty of information is the least contributor to the perceived utility of information and, thus, usability. Novel information causes a certain degree of surprise and challenges existing beliefs and routines in an NPD team. This creates a "not-invented-here" syndrome, which in turn leads to lower perceived utility. Therefore, novel information might be perceived as unhelpful to performance. These interpretations should be tempered by the fact that the negative moderating effect of product newness to the firm was not overwhelming. Other contextual factors not measured here may be important.

The results suggest that the departmental power of marketing has a significant but negative moderating effect on the rela-

tionship between marketing's influence and new product market performance. It seems that when marketing is perceived as more powerful, new product teams are likely to comply with its demands only under pressure. This reduces the efficacy of marketing's influence on new product outcomes. The findings also suggest that influence attempt has a significant positive moderating effect on the relationship between marketing's influence and new product market performance. This finding indicates that, though marketing's influence may have a significant effect on new product market performance, marketing need not be complacent. Because of the overall power and influence of R&D in the NPD process in high-technology firms, marketing must do more to enhance the efficacy of its influence on NPD outcomes. One way to do this is through stronger influence attempts. Efforts by marketing to engender enthusiastic acceptance will increase its efficacy. This interpretation is consistent with Kohli's (1989) suggestion that, in buying centers in which other departments appear to have strong influence and power, an individual's influence is enhanced when accompanied by strong influence attempts.

Managerial and Research Implications

Preliminary implications are useful because of the absence of guidelines for managing functional participation and influence in high-technology firms' NPD process in China's transitional economy. Because of the differential effects of participation and influence on new product performance, it is important for project managers to encourage marketing's influence on NPD decisions rather than just its participation. Only when marketing achieves influence can its contributions to new product performance be realized. Project managers must understand the effect of marketing's influence on new product performance from a contingency perspective. The findings suggest that marketing's influence on timeliness of development is weakened when the project is highly formalized. Its influence on market performance is hindered when the product being developed is new to the firm and marketing's power is perceived to be high. The rationale is that these situations may lead to little identification with and internalization of marketing demands by NPD team members. A critical task for project managers is to create a climate in which new product teams can identify and internalize rather than simply comply with marketing's inputs.

In drawing implications from these results, it is particularly important to be mindful of the limitations of the cross-sectional and perceptual nature of the study. Furthermore, the small sample size limits the robustness of the statistical analysis and, thus, the conclusions. As mentioned previously, the measure of participation is not complete because it only taps the quantity of information provided by marketing and overlooks other dimensions, such as novelty, quality, and timeliness (Moenaert and Souder 1996). However, the re-

sults are encouraging enough to warrant further research along the following lines.

First, the findings pertain to firms in high-technology industries; in other industries, the results might differ. An "engineering-driven culture" is likely in the firms examined in this study, so additional research should compare these results with those obtained from firms with a market-driven culture. Second, potential social desirability bias is inherent in any research on influence. Future work will enhance understanding of the influence of marketing if alternative sources of informants are used. Third, the single informant design is a concern. Further research should assess marketing's influence from multiple respondents to ensure consensus and greater validity. Calantone, Schmidt, and Song (1996) suggest that consensus decision making in NPD is the norm in China; therefore, data collection should ensure that respondents gain the consensus of others in the new product teams on questions asked. Fourth, the concept of interdepartmental conflict used in this study pertains to dysfunctional rather than functional conflict. Additional research should examine the effect of both types of conflict on marketing's participation and influence in new product teams.

The influence of R&D in NPD was not examined in this study. Research that examines the influence of marketing and R&D and their differential effect on new product outcomes in a comparative framework will advance the NPD literature. Finally, the rationale for marketing influence on new product outcomes was built on the extent to which NPD team members comply, identify, or internalize marketing's demands and requests in the process. These process variables were not studied explicitly. Therefore, research examining the degree to which NPD team compliance, identification, and internalization mediate the linkages between marketing influence and new product outcomes should be pursued.

A Profile of the Sampled Firms

Type of Industry	Percentage
Electronic information	59.8
Integrated optical-mechanical and electrical products	11.0
Chemicals	7.9
New pharmaceuticals/bioengineering	4.7
Precision machinery	3.9
New energy and new materials	3.9
Others	8.8
<i>Ownership</i>	
State-owned	36.6
Collectively owned	23.6

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APPENDIX

Privately owned	8.9
Foreign-owned	6.5
Public listed	13.8
Joint venture	10.6
<i>Number of Employees</i>	
50 or fewer	40.7
51 to 200	28.9
201 or more	30.4
<i>Turnover Spent on R&D</i>	
Less than 1%	13.3
1% to 3%	19.0
3.1% to 5%	18.8
5.1% to 9%	28.5
9.1% or more	20.4
<i>Types of New Products</i>	
Product modification	27.8
Line extension	38.9
New product to the firm	7.1
New product to the Chinese domestic market	15.9
New-to-the-world product	10.3
<i>Respondent's Experience in NPD</i>	
1 year or less	16.9
2 to 4 years	44.8
5 to 9 years	22.1
10 years or more	16.2

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